Medical
PROGRESS

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Congenital Dislocation of the Hip

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Congenital dislocation or subluxation of the hip (congenital acetabular dysplasia) is a complete or partial displacement of the femoral head out of the acetabulum. The physical signs essential for diagnosis are age related. In newborns the tests for instability are the most sensitive. After the neonatal period, and until the age of walking, tightness of the adductor muscles is the most reliable sign. Early diagnosis is vital for successful treatment of this partially genetically determined condition. Various therapeutic measures, ranging from abduction splinting to open reduction and osteotomy, may be required. Following diagnosis in the first month of life, the average treatment time in one recent series was only 2.3 months from initiation of therapy to attainment of a normal hip. When the diagnosis was not made until 3 to 6 months of age, ten months of treatment was required to achieve the same outcome. When the diagnosis is not made, or the treatment is not begun until after the age of 6, a normal hip will probably not develop in any patient.

"There are persons, who, from birth or from disease, have dislocations outward of both the thighs; in them, then, the bones are affected in like manner, but the fleshy parts in their case lose their strength less; . . . They have the equal use of both their legs, for in walking they totter equally to this side and that."[1] Thus Hippocrates, in *About Articulations* described hip dislocations in the second century B.C.

CONGENITAL DISLOCATION of the hip is a genetically influenced condition in which there is a disturbance of the normal anatomy of the hip, either a complete dislocation of the head of the femur from the acetabulum or a partial displacement (subluxation) from the socket. Inadequate development of the roof of the socket (dysplasia) and laxity or elongation of the ligaments and capsule of the joint may be primary pathogenic features; both will be discussed in greater detail later. True congenital dislocation of the hip must be distinguished from teratologic dislocations such as may occur in arythrogryposis multiplex congenita, diastrophic dwarfism, Larsen's syndrome and other rare generalized mesenchymal disorders. It should also be distinguished from the paralytic dislocations which may occur in cerebral palsy, myelomeningocele, and following paralytic anterior poliomyelitis. In true congenital disloca-

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tion of the hip there are no other consistent abnormalities, with the possible exception of generalized joint laxity which is otherwise not disabling. It has been estimated[2] that 5,300 new cases occur annually in the United States.

Congenital dislocation of the hip has interested physicians and surgeons alike for centuries. Paletta, in 1775, was the first to use the term subluxation. As early as 1784 Camper is said to have commented on the preponderance of affected females. Dupuytren,[3] in 1826, described the autopsy findings in the case of a 74-year-old man who also suffered from "retention of urine, terminating fatally." He speculated that "the position of the lower extremities of the fetus in utero is such, that the thighs are very much bent on the belly, from which it follows that the heads of the thigh bones are continuously pressing against the lower and back part of the capsular ligament—a circumstance which, although without effect in well-formed individuals, might, I apprehend, have an injurious influence in such as are weak, or of lax, unresisting fibre. If this premise is conceded, there is not much difficulty in imagining that dislocation may result . . . "

Incidence

The incidence of congenital dislocation of the hip varies with the gene pool studied, high frequencies being reported in certain inbred Italian populations, in Israel, among certain American Indian tribes and among the Japanese. Substantial and very similar frequencies have also been reported from Sweden, Great Britain and the northern part of the United States,[4] an observation that suggests a similar genetic derivation of the inhabitants of these areas, as history in fact substantiates. The condition is by no means uncommon in other population groups, although in Africans and Chinese very low incidences have been reported. Incidence figures are somewhat confused by the fact that if careful examinations of newborn infants are routinely done, a very high proportion of unstable hips can be found.[5] The majority of these, however, become stable in the first few weeks of life,[5-7] and likely represent the substrate upon which other factors, probably environmental, act to produce true persistent dislocations, the frequency of which is about 1.1 per 1,000 live births in the United States.[4,8]

Etiology

Paré noted as early as 1678 that familial cases occurred, and all epidemiologic studies clearly indicate that heredity plays a very significant role in cause. The recurrence risk among siblings of affected persons is about 40 times as great as the incidence expected in the general population. Only one large survey of twins with congenital hip dislocations has been reported, in Germany, and a much higher concordance rate for monozygotic (41 percent) than for dizygotic twins (2.8 percent) was found. This clearly indicates the role of genetic influences, but also indicates that other factors must be operative. The proportions of affected second and third degree relatives is also increased, but drops rapidly toward the incidence found in the general population with decreasing closeness of the relationship, thus conforming most closely to the model for polygenic inheritance.

Among the environmental factors closely related is breech delivery, which is reported as having occurred in 11 to 40 percent of cases,[9] in contrast to the expected 2 to 4 percent. In addition, some series report a birth order effect, with first-born children being most commonly affected.[10] Several surveys have also reported an increased incidence of congenital dislocation of the hip during the winter months.[11,12]

Additional environmental factors which have attracted attention are the supposedly deleterious effects of swaddling, a custom in certain European and American Indian populations,[13] and the allegedly salutary effects of carrying an infant astride the back. The former holds the hips adducted, whereas the latter holds the hips abducted, consequently allowing better seating of the femoral heads in the sockets. In implied agreement, the American Academy of Pediatrics has adopted as a symbol a modified version of the famous Della Robbia terra-cottas (of the Spedale degli Innocenti in Florence) of a swaddled infant in which the constricting garments have been loosened. Results of experiments with animals have in fact shown that dislocations of the hips can be provoked by immobilizing the hindlegs in abnormal positions; however, the general caveat regarding extrapolation from animals to humans should be heeded.

Some authors[13] believe that sudden extension of the hip after delivery of an infant, as might occur in the common practice of holding the newborn infant by the ankles and slapping the back

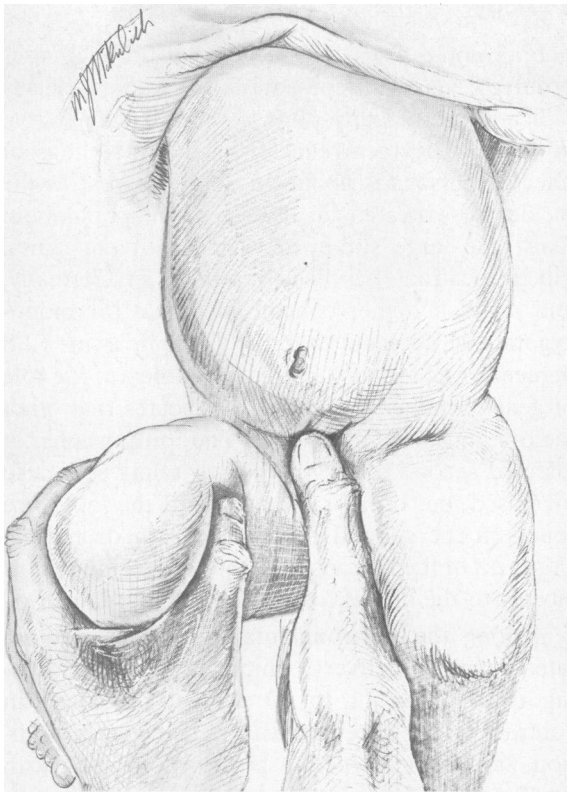

Figure 1.—Barlow's maneuver. With one hand grasping the symphysis in front and the sacrum in back, lateral pressure is applied to the medial thigh with the thumb of the other hand while longitudinal pressure is applied with the palm to the knee on the side being examined. The hip, which has been flexed 90 degrees, is then adducted. A positive sign is a sensation of abnormal movement, indicating dislocation of the femoral head from the acetabulum. The hands are reversed for examining the other hip. This sign and Ortolani's sign may be found only in the first few weeks of life. (Reproduced by permission from Specht EE: Am Fam Physician 9:88-96, Feb 74)

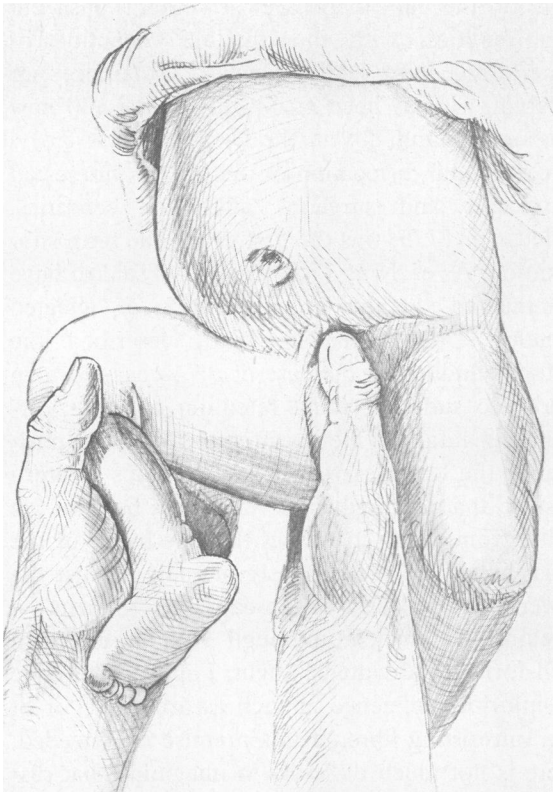

Figure 2.—Ortolani's maneuver (sign of jerking into place). After provocation of a dislocation by Barlow's maneuver, as shown in Figure 1, the hip should be abducted to about 80 degrees while the proximal femur is lifted anteriorly with the fingers placed along the lateral thigh. A positive sign is a sensation of a jerk or snap with reduction into the socket. A click is not necessarily heard and a click wihout a sensation of abnormal motion is probably not significant. (Reproduced by permission from Specht EE: Am Fam Physician 9: 88-96, Feb 74)

to drain respiratory secretions, is deleterious, at least in the presence of laxity of the capsule and ligamentum teres.

It has long been recognized that females are about five times more commonly affected than males, and a hormonal effect has been inferred. Some observers[14] have in fact reported that estrogen excretion levels are higher in affected infants than in normals, but others[15] have failed to confirm this. The belief, however, that female infants are more sensitive to the hormones of pregnancy and that these hormones cause greater ligamentous laxity than in the male, holds some currency. Findings in several studies[16] have shown that both patients and first degree relatives of patients have an unusual degree of joint laxity. This is probably inherited as an autosomal dominant trait, therefore giving an incidence of joint laxity in 50 percent in the offspring of an affected person. Obviously this far exceeds the risk factor in congenital dislocation, but environmental factors vary, and necessarily modify the genetic predisposition in such families.

Results in other familial studies[16,17] indicate that defective development of the acetabulum, with a resulting shallow socket (primary acetabular dysplasia), a concept popularized by Hart,[18] may be polygenically inherited, and that those cases diagnosed after the neonatal period may represent the dysplastic rather than the ligamentous laxity type.[19,20] It is thus possible that two genetic systems, one autosomal dominant and the other polygenic, may interact and in turn be acted upon by environmental factors.

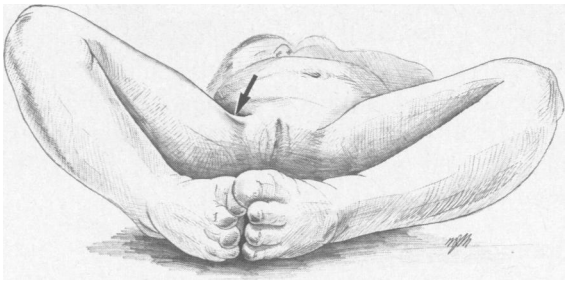

Figure 3.—Adduction contracture. In the infant or child over 1 or 2 months of age, limitation of abduction of the flexed hips is probably the most reliable sign of congenital dislocation. Note the prominent "bowstringing" of the adductor tendon in the proximal thigh on the dislocated right side, as well as the limitation of abduction in comparison with the normal side. (Reproduced by permission from Specht EE: Am Fam Physician 9: 88-96, Feb 74)

Genetic Counseling

The empiric recurrence risks have been calculated[21] as follows: (1) with normal parents, the risk to subsequent brothers of an index patient is 1 percent, to subsequent sisters, 11 percent. (2) If one parent has a congenital hip dislocation the risk to a son is 6 percent, to a daughter 17 percent. (3) If there are one parent and one child in an affected family, the risk to a second child rises dramatically to 36 percent. The implications of these data are obvious; at the very least careful and repeated examinations of all infants in such families must be started at birth.

Problems in Early Diagnosis

There is general agreement among authorities that the earlier treatment is started, the better the prognosis—a concept popularized by Putti.[22] Considerable advances have been made since the adoption of Ortolani's technique[23] for diagnosis in the newborn period. Von Rosen[24] in 1962 reported his results in the application of Ortolani's technique, which is described in the accompanying illustrations. This and Barlow's[6] description of a maneuver which provokes dislocation in unstable hips have undoubtedly greatly increased the numbers of infants who present for early treatment. Every physician who examines children should be thoroughly conversant with these techniques which are described and illustrated again (Figures 1 and 2) without apology. One bit of confusion regarding Ortolani's "sign of the click" bears some mention. The English word click is an unfortunate translation of the Italian *scatto* which has no English cognate, and which means a "jumping up" or "jerking into place," which in fact is what happens when the dislocated or subluxed hip is abducted while being held in 90 degrees of flexion. There is nothing audible about this "click," and in fact most clicks are not significant.[15,25] It is the palpable, and sometimes visible, reduction of the dislocated head into the socket that constitutes a positive finding.

Barlow's maneuver consists essentially of provoking a dislocation by longitudinal pressure along the femur, with the hip flexed and adducted and then reducing it in the same manner as in the Ortolani maneuver. The infant must be relaxed while these maneuvers are being carried out, and a crying infant must be reexamined; in fact, repeated examinations[26,27] throughout the first year of life are essential if cases are not to be missed.[25,26,28-30] Unfortunately, roentgenography cannot be relied upon to resolve doubt remaining after clinical examination[25,26,31] in the newborn period. Only following ossification of the capital femoral epiphyses at age four months or so can roentgenograms clearly delineate the relationship of the femoral head to the acetabulum.

Ortolani's and Barlow's tests are of great value in the first few weeks of life, while the hip can still be reduced easily; however, once the head of the femur has migrated laterally and proximally onto the lateral surface of the ilium and the adductors have become relatively shortened and tight, other signs must be sought. Following the first month or so of life in an affected infant, abduction of the flexed hip, normally possible to at least 60 or 70 degrees,[4] becomes limited (Figure 3). It is of course helpful to compare abduction on one side with the other, but it should be borne in mind that bilateral involvement is not uncommon, in fact more common in some series,[31] and one must know the normal measurements. Shortening of the extremity (Figure 4), consequent to proximal displacement of the femoral head, can be detected by careful comparison of the lengths of the extended legs or by the method of Galeazzi in which the hips and knees are flexed to about 45 degrees while holding the heels equidistant from the buttocks on the examining table. In the bent-knee method the dislocated side will show the knee to be lower, that is closer to the table.

Asymmetry of the inguinal and buttocks skin creases, and relative prominence of the greater trochanter on the affected side are all useful later signs. Asymmetry of the thigh folds, however, is not useful—yielding a very high incidence of false positives. After the child begins to walk, very

late in the game to make a diagnosis, the characteristic painless abductor lurch (Trendelenberg gait) toward the affected side, and an external rotation attitude of the involved leg may be noted.

We still find late cases and the question has been raised[20] if they represent a different group of "stiff hips" than those which present early with instability. This would fit nicely with the thesis of two genetic entities[16] with a common end result, but as yet the proof is lacking.[20] In any case, it should be reiterated that one normal examination in the nursery does not relieve the physician of further diagnostic efforts.

A significantly higher incidence of congenital dislocation and subluxation of the hip in infants affected by congenital muscular torticollis has been noted by two groups of authors.[32] The frequency of dislocation and subluxation combined was 20 percent in one series of infants who had presented for torticollis. The diagnostic inference is clear; all such infants should be carefully examined, and probably x-ray studies should be done as well.

Roentgenographic Features

The diagnosis of congenital dislocation is essentially a clinical one; however, roentgenograms can be of considerable help—especially in following progress under treatment. Efforts have been made[6,28,33] to use roentgenograms in the newborn period, but opinions vary considerably as to their efficacy,[11,25] and most authorities agree that normal findings on x-ray films do not exclude the possibility that a dislocatable hip was x-rayed while in the reduced position[31] and the finding therefore gave a false sense of security (Figure 5). After the age of 4 to 6 months, at which time the capital femoral epiphyses ossify, roentgenograms in the anteroposterior and "frog-leg" lateral positions will satisfactorily delineate the relationships between the femoral head and the acetabulum. A horizontal line drawn transversely across the pelvis through the centers of both triradiate

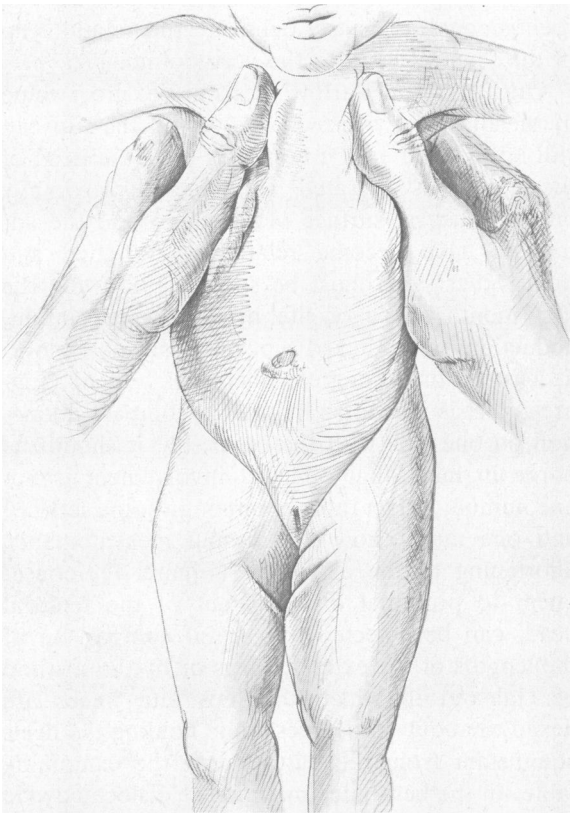

Figure 4.—Asymmetry of the thigh and inguinal creases. Bilateral asymmetry of the thigh creases alone is an unreliable sign but asymmetry of the inguinal or gluteal creases, especially with apparent shortness of the thigh, is a good indication of hip dislocation. Note that the infant's left knee is higher than the right and the prominence of the greater trochanter on the left is more pronounced and more proximal than on the right. The left hip is dislocated. (Reproduced by permission from Specht EE: Am Fam Physician 9:88-96, Feb 74)

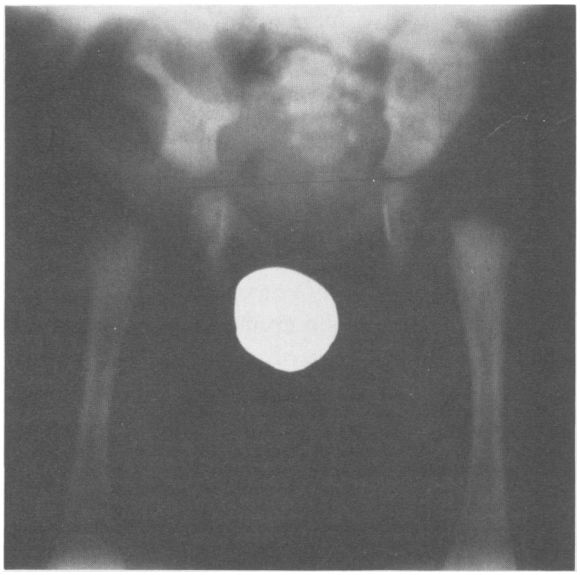

Figure 5.—This roentgenogram shows the difficulty in evaluating x-ray studies of the hips in newborns. Although the hips appear symmetric and are not obviously displaced superiorly, there is a suggestion of lateral subluxation bilaterally. The acetabulums appear normal. This infant had positive Barlow and Ortolani signs and was treated with a splint because of the positive clinical findings, in spite of the equivocal x-ray findings. (Reproduced by permission from Specht EE: Am Fam Physician 9:88-96, Feb 74)

cartilages in the acetabula and a vertical line dropped from the lateral margin of the bony roof of the socket to intersect the horizontal line at right angles is useful in detecting abnormally lateral and superior position of the capital femoral epiphyses. In a normal hip, the ossific nucleus of the femoral head lies below the horizontal line and medial to the vertical line. As subluxation occurs the ossific nucleus is either bisected by the vertical line or lies lateral to it. Similarly, proximal migration of the femoral head, which ultimately comes to rest superior to the horizontal line, occurs.

Another useful measurement in following progress in treatment, and in diagnosis in late cases at least, is the so-called acetabular index[34] (Figures 6 and 7) which might better be called the roof-slope angle. Lines drawn along the acetabu-

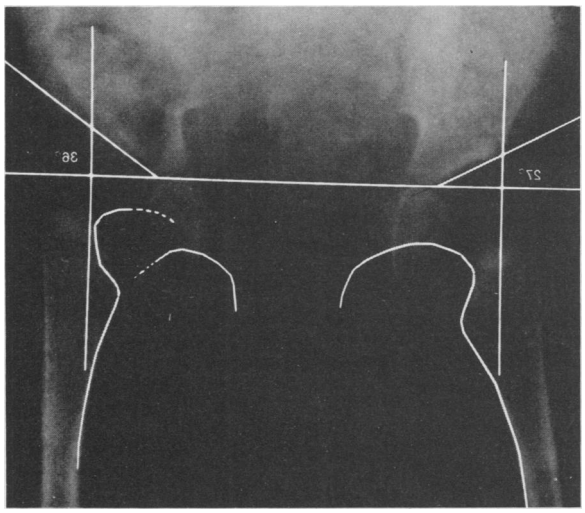

Figure 6.—Shenton's lines and the acetabular index. In this patient, the left hip is obviously displaced both laterally and superiorly, as shown by the disruption of Shenton's line (medial neck to superior obturator fossa) on the left. On the normal right side, the typical shepherd's-crook configuration of this imaginary line is preserved. The acetabular index, which simply indicates the slope of the roof expressed as degrees of angulation from the horizontal, is increased on the left side. (Reproduced by permission from Specht EE: Am Fam Physician 9:88-96, Feb 74)

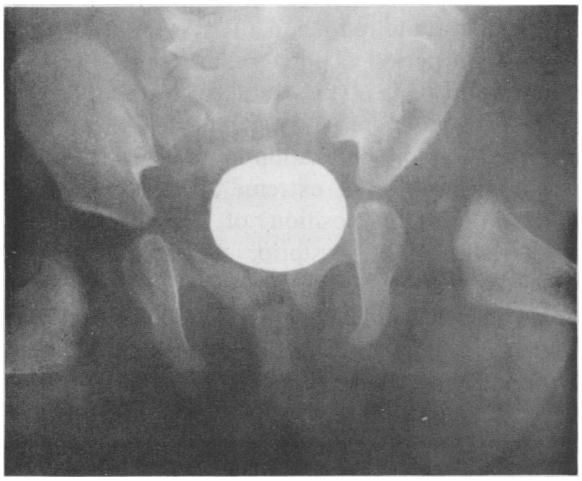

Figure 7.—A frog-leg lateral view of the same hips as shown in Figure 6. This view shows the relative underdevelopment of the capital femoral epiphysis on the patient's left side. Delayed development cannot be detected until this ossification center becomes visible on x-ray studies, usually at 4 to 6 months of age. (Reproduced by permission from Specht EE: Am Fam Physician 9:88-96, Feb 74)

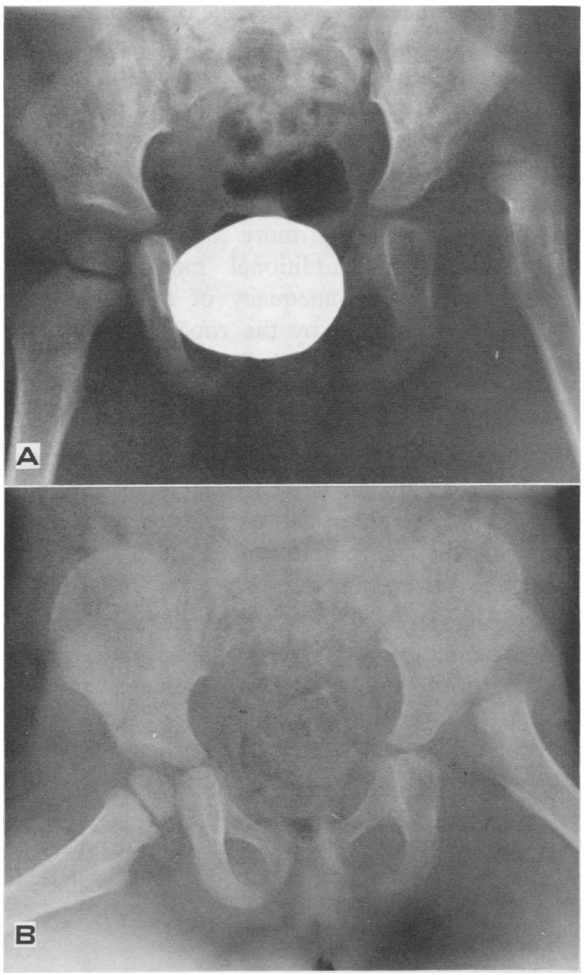

Figure 8.—Typical superior displacement of the left hip, as seen in the anteroposterior view **(A, above)** and the frog-leg lateral view **(B, below).** Note the failure of acetabular development and the relative hypoplasia of the entire femoral head and neck on the left. Note also that the left hip cannot be abducted as well as the right hip, because of tightness of the adductor muscles. This is a roentgenogram of a 3-year-old girl, untreated at the time. (Reproduced by permission from Specht EE: Am Fam Physician 9:88-96, Feb 74)

lar roof and extended to intersect the horizontal line will form an acute angle which is easily measured, and which is increased in dysplasia and dislocation. This angle normally becomes more acute with increasing age. The normal values for this angle have been described[27] and can be helpful in diagnosing dysplasia, particularly if there is a pronounced discrepancy between the two sides. With sufficiently early and successful treatment the acetabular index declines to normal, whereas the slope increases and assumes a bilabiate appearance if dislocation persists (Figures 8A and 8B).

A line can be projected along the medial portion of the femoral neck, the calcar femorale, and extended medially to intersect the margins of the obturator foramen in the anteroposterior projection (Figure 6). Normally this medial projection will correspond exactly with the superior margin of the foramen; if there has been proximal displacement of the head, however, the line will be disrupted and will pass more toward the triradiate cartilage. An additional measurement of value in appraising adequacy of reduction and coverage of the head by the roof is the center-edge angle of Wiberg[35] in which an angle is constructed by a line drawn from the center of the head through the lateral margin of the acetabulum, intersecting at that point with the vertical line described above. This "CE angle" is normally more than 20 degrees, and declines to zero as the center of the laterally-displaced head comes to lie on the vertical line.

Arthrography[36] is used by some surgeons to evaluate adequacy of reduction and to delineate the condition and position of the acetabular labrum (the limbus) and other soft tissues interposed between the head and the medial wall of the acetabulum, but its usefulness is limited. In our hands tomography[37] has been useful to ascertain that a concentric reduction, without posterior displacement, has been obtained when the patient is in a cast or splint.

Treatment

Treatment of congenital dislocation of the hip is perhaps more clearly age-related than any other condition in medicine, a fact that reflects progression of secondary pathologic changes. In an infant with dislocatable hips due to ligamentous laxity (a primary change occurring before the development of secondary changes, such as increased slope of the acetabular roof, adductor tightness and actual dislocation of the head) simple abduction splinting by any of several devices[6,11,24,31,38] will almost invariably result in a normal hip.[6,11,24,28] In fact such treatment is probably best considered prophylactic.

Following the first few weeks of life, however, the difficulty in attaining normal clinical and roentgenographic findings is greatly increased[38-40] hence the considerable efforts expanded on early diagnosis and treatment.

Although there are exceptions,[41] most orthopaedic surgeons[42,43] believe that nonoperative management, as propounded by Putti[22] some 40 years ago, is best until the child begins to walk, and perhaps later. Opinions vary on details and a review of the literature suggests that there are no hard data on precisely when conservative management ceases to be appropriate. Most would agree that up to the age of 6 months or so, abduction splinting, or the Pavlik harness[44] currently gaining favor, is indicated until the clinical and roentgenographic findings revert to normal in both dysplasia without frank dislocation and in dislocation. This may be a matter of some months, and a period of immobilization equal to the elapsed time between birth and initiation of treatment has been suggested as a guideline to duration. Demonstration, by x-ray films taken in the abduction device, that the hip is in fact reduced is essential. Between the ages of 6 and 12 months, gentle manipulation under anesthesia may be required to attain reduction. This should be followed by a period of immobilization in a cast in the position of maximal stability. In recent years there has been increasing awareness of the danger of prolonged immobilization in either the frog-leg (Lorenz) position of extreme abduction[45] or the internal rotation position of Lange—both of which subject the posterior retinacular vessels, which supply the capital femoral epiphysis, to extreme mechanical distortion. It is commonly believed, and probably correctly so, that these bizarre positions may contribute to the development of avascular necrosis of the femoral head (osteochondrosis), and instances have been reported in which the previously normal hip in unilateral cases developed avascular necrosis during treatment.[46] It should also be noted that this complication is never seen in untreated patients, and can fairly be said to be iatrogenic. In an effort to avoid this catastrophe, a position involving somewhat more flexion but considerably less ab-

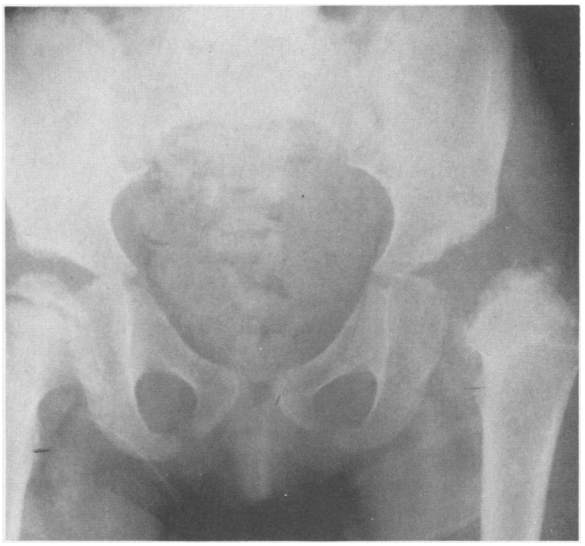

Figure 9.—Complications of treatment. The left hip is displaced superiorly and laterally from the acetabulum, Shenton's line is disrupted and the capital femoral epiphysis has undergone avascular necrosis. This hip had been treated by closed reduction and immobilization in a plaster cast. Prognosis is poor. (Reproduced by permission from Specht EE: Am Fam Physician 9: 88-96, Feb 74)

duction of the hips, a so-called "human position," has been advocated.[45] Conclusive data on the incidence of complications in its use are not yet available.

Casts used during this age range will become uriniferous quite quickly, and skin problems may arise. In some instances the substitution of a plastic splint or the cloth harness of Pavlik may be satisfactory after a month or two of plaster immobilization, but again, maintenance of a concentric reduction must be confirmed by biplane or tomographic roentgenography.

Between the ages of 1 and 3 years, secondary changes such as increased slope of the roof of the acetabulum, inversion of the limbus, fibrofatty masses filling the acetabulum, increased femoral anteversion (which will be discussed later), poorly formed femoral head, thickening and hourglass constriction of the capsule, hypertrophy and elongation of the ligamentum teres, and tightness of the muscle origins and insertions about the hip (particularly the adductors and the iliopsoas) are fully developed. Management during this period is the subject of considerable discussion and diversity of opinion. Closed reduction following preliminary skin traction[39,42,43,45] is probably the method used most between ages 1 and 2. Preliminary subcutaneous adductor tenotomy[39,43] has an increasing number of advocates in keeping with the desire to minimize the risk to the vascular supply of the head (Figure 9). When the adductors have shortened and the head is lying high on the lateral wall of the ilium, any attempt to reduce it into the acetabulum, several centimeters distally, and at the same time to abduct the thigh to achieve stability of the reduction will necessarily exert leverage on the head and cause compression of the vessels, which it is believed can be lessened by sectioning the structures medial to the head and neck. Some authorities hold that the adductors are of major concern in this regard, while others[41] believe the focus of attention should be on the iliopsoas tendon. Statistical validation of either position is lacking, but animal studies have indicated a decreased incidence of vascular changes following adductor tenotomy.

Open reduction enjoys some advocacy[41] before 2 years of age, and is increasingly used in those over 2 years old;[39] it is currently usually combined with osteotomy of the innominate bone,[47-53] and sometimes with derotational osteotomy of the proximal femoral diaphysis to correct anteversion. Two kinds of innominate osteotomy have been described for use early in life and have approximately the same usefulness. The pericapsular osteotomy of Pemberton[47,50,52] depends on some plasticity of the triradiate cartilage to allow a hinge motion to occur and hence may be more useful in younger children and where it is desirable to make the socket somewhat smaller. The procedure described by Salter[48,49,51,52] lends itself better to management of older children because the bend comes by levering the wing of the ilium laterally and downward over the femoral head after it is reduced into the acetabulum. We have seen instances where the osteotomy was neatly done but the head was never reduced into the true acetabulum. Both of these procedures should be done *only* if the head can be pulled down opposite the true socket by preliminary traction, and the acetabulum *must* be identified at operation by its normal cartilaginous surface, which is invariably present.[54] To conceive of these procedures as primarily innominate osteotomies is erroneous. They are primarily open reductions with osteotomies to improve bony coverage of the head.

Another promising advance in managing this difficult problem is the addition of subtrochanteric resection osteotomy[55-58] in which 1 to 2 cm of bone are excised from the proximal femur, de-

pending on the tension of the muscles about the hip as seen at the operating table. One of the remaining problems in open reduction and innominate osteotomy is the pernicious tendency of the head to redislocate while in the cast, or perhaps even while the cast is being applied. This is a consequence of two factors, persistent femoral anteversion and tension on the muscles crossing the hip joint. Both of these factors can be dealt with at one sitting by subtrochanteric resection and derotation osteotomy combined with open reduction. The concept of derotation osteotomy in the management of femoral anteversion is not new,[39,59-61] and while some contend it is unnecessary, others are equally convinced it is on occasion critical to obtaining the best result. The question of future leg-length discrepancy must inevitably arise when bone is resected from one leg, and no long-term results are yet available; however, it should be noted that sacrifice of 2 cm or so of bone, the average necessary, will likely eventuate in only a ½ cm discrepancy because of the well-known tendency of the adjacent epiphyses to overgrow following fracture and other insults. A ½ cm, or even a 1 cm disparity in leg lengths is negligible compared to the long-term sequellae of persistent hip dislocation or repeated operative intrusion and resultant loss of motion.

In children over the age of 7 or 8 who first appear for treatment, and perhaps in some in which there has been failure of previous treatment, the advisability of salvage procedures arises. In times gone by the Hey-Groves-Colonna capsular arthroplasty[62-64] and various shelf procedures[65,66] were widely used and still enjoy some support,[67] but other authors[68,69] contend that at least in the bilateral cases nothing should be done after the age of 7 or so. Another procedure gaining advocacy in older children and young adults with persistent dislocations is the innominate osteotomy of Chiari,[70] which should be viewed as a salvage procedure when traction and reduction do not appear feasible. In this procedure the ilium is cut through above the femoral head, which is then displaced medially under the buttress of the osteotomy. Preliminary results are encouraging, and the provision of bony stock above the femoral head will undoubtedly be helpful should subsequent reconstruction be necessary.

Other procedures which should be mentioned for completeness, but which appear to have fallen from favor are the so-called pelvic support osteotomies,[71] in which the proximal femur is transected, the proximal fragment is adducted against the pelvis and the distal fragment is abducted relative to the proximal. It is held that the displaced proximal fragment helps to support the pelvis, minimizing the abductor lurch which occurs during gait. Early postoperative results have been described as encouraging, but there are no series of significant size over a period of years, and some question must arise as to the effect on the knee of such realignments of the proximal femur.

Complications and Prognosis

The most common complications of treatment are failure to obtain concentric reduction, loss of motion from operative intervention, the possibility of postoperative infection of the joint and avascular necrosis of either the affected or the normal hip (Figure 9). Premature epiphyseal fusion of the knee has also been described,[72] Sequellae of failure to obtain reduction, or of no treatment, are the development of premature degenerative joint disease.[36,73] We have seen symptoms of easy fatigability and discomfort occur in adolescence; however, most patients do remarkably well at this age in spite of an unsightly lurching gait, in which the center of gravity is shifted toward the affected hip during the stance phase of gait, thus causing the trunk to sway laterally. This occurs because the lever arm of the abductor muscles of the hip, which must maintain the pelvis level, is mechanically deficient. This allows the pelvis to tilt abnormally away from the affected hip when it is bearing weight. The effort to compensate for this deficiency and prevent falling results in the shift of the center of gravity described above.

The usual course of a dislocated hip is one of increasing pain and disability during early middle age, a time when most women need to remain active in the care of their families. During this period many will require reconstructive arthroplasties[74,75]— a subject in itself and beyond the scope of this paper. Thus one can see the crucial need for early diagnosis and skillful management. With the virtual disappearance of poliomyelitis as a crippler of young people, there is probably no single area in which the primary care physician can be so effective in the prevention of late crippling. Nowhere else is the proverbial ounce of prevention (in this context a high index of

suspicion and a willingness to examine carefully hundreds of babies in order to identify the one at risk) of greater curative value to the patient. To reiterate the words of Putti "La cura preambulatoria non é piú una vuota aspirazione."

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The Obese Patient

To have a significant impact on life expectancy, in the actuarial sense, one has to have a weight which deviates by more than 30 percent from the expected weight for that person at his particular height. Basically, if you are overweight, you have a risk that is about 4.9 times as great of being diabetic, about 3 times as great of being hypertensive and of developing hypertensive cardiovascular disease, and about 2½ times as likely to develop gallbladder disease with gallstones and complications therefrom. So, for people who are significantly overweight, there are substantial medical risks associated with that weight which, therefore, allow the physician, because of the risk of the obesity as a factor in the development of these conditions, to employ methods which have a somewhat higher risk-to-benefit ratio than for a patient who is less than 30 percent overweight and who has no medical problems that can be detected.

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